

WESTERN HEMLOCK SERIES

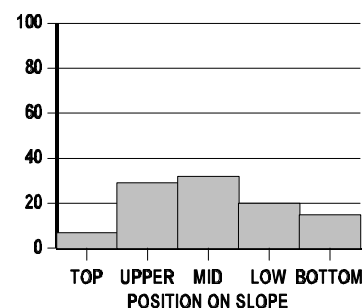
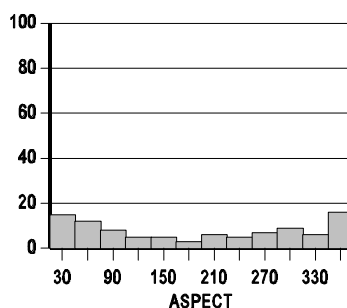
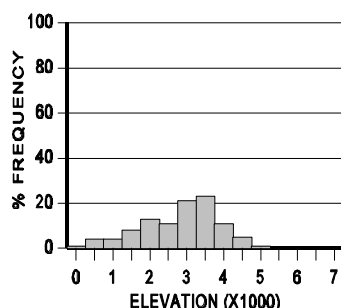
Tsuga heterophylla

TSHE

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Southwestern Oregon is the southern end of the range of the Western Hemlock Series. In the Cascade Mountains, this Series is abundant on the Cottage Grove and North Umpqua Ranger Districts and adjacent Bureau of Land Management lands. It extends south through the Umpqua National Forest to the Butte Falls Ranger District of the Rogue River National Forest. It is likely limited by dry conditions and is replaced by the White Fir Series to the south. In the Coast Range, the Western Hemlock Series extends south into the Gold Beach Ranger District of the Siskiyou National Forest and adjacent lands, and is replaced by the Tanoak Series where temperatures are warmer. The Douglas-fir Series occurs on hotter, drier sites, and the Pacific Silver Fir and Shasta Red Fir Series occur at higher elevations on cooler sites.

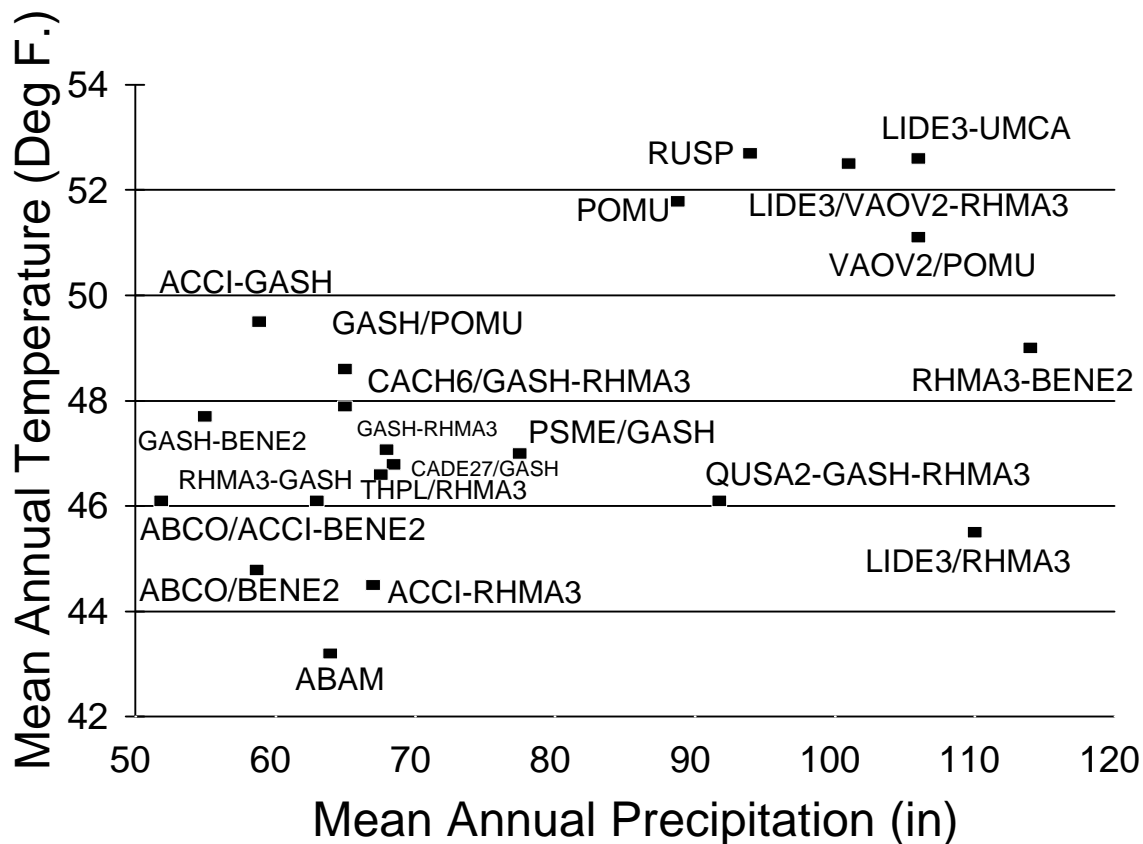
The Series covers a wide elevational band, though the average is approximately 3000 feet. It occurs on many types of soils. All aspects except south are well represented, and upper, middle, lower and valley bottom slope positions are more common than ridge tops. The Series includes highly productive lands, and has a high plant species diversity.



The Western Hemlock Series generally occurs in areas that are warm. Average annual temperatures range from 43 degrees F in the High Cascades to 53 degrees F in coastal areas. Average annual rainfall varies between 50 inches in drier areas of the Cascades to 115 inches near the coast.

Parent material is highly variable, although andesite and basalt are the most common. Soils range from shallow to deep, although moderately deep to deep are the most frequently encountered conditions. They are generally moderately to excessively well drained. Surface textures range from sand, sandy loam, loam, and loamy sand to sandy clay loam, silt loam, and clay loam. Rock fragments range from 5 to 80 percent, and clay content ranges from 1 to 60 percent. Subsurface textures range from sandy loam, loam, and silt loam, to sandy clay loam, clay loam, and occasionally clay. Rock fragments are between 2 and 90 percent. The soil moisture regime is either udic or xeric, the former being the most common. The temperature regime is frequently mesic and occasionally frigid. Samples include 95 soil pits.

The relative environments of the plant associations are shown below. Each association is plotted by mean annual temperature and mean annual rainfall.



As a result of frequent disturbances in southwestern Oregon, Douglas-fir, an early seral species, is the dominant overstory tree in the Western Hemlock Series. Western hemlock is the dominant tree species in the understory, and is particularly abundant in older stands with a low frequency of disturbance. In wetter areas of the Cascades, western redcedar is present, and at higher elevation, cooler areas, white fir or Pacific silver fir are present. In the coastal Siskiyou Mountains, tanoak may be present, and in areas that tend toward ultramafic soils, Port-Orford-cedar is common. Salal is widespread throughout the Series, absent only from the high elevation, cooler areas, and the lowest elevation wet sites. Pacific rhododendron is common, but less widespread than salal, and tends to reflect low productivity areas. Golden chinquapin and whipplevine are present on dry, rocky sites.

Average vascular plant species richness for the Western Hemlock Series ranges between 18 and 38. In this series, richness is rated as very low, 18 to 21 species; low, 22 to 25 species; intermediate, 26 to 29 species; high, 30 to 33 species; and very high, 34 to 38 species.

Upper layer tree canopy cover ranges from 58 percent in the Western Hemlock-Douglas-fir/Salal Association, to 84 percent in the coastal Western Hemlock/Pacific Rhododendron-Dwarf Oregongrape Association. The mid-layer tree canopy cover ranges between 39 and 65 percent. The lower layer tree canopy cover ranges

between 24 and 56 percent. High shrub cover ranges between 1 and 44 percent, and low shrub cover ranges between 10 and 81 percent. Herb/grass layer cover ranges between 10 and 85 percent.

Twenty-one plant associations have been identified for the Series in southwestern Oregon. They were described from 272 plots (178 Forest Service, 76 Natural Resource Conservation Service, and 18 Bureau of Land Management). In addition, on the Cottage Grove Ranger District, the Western Hemlock/Dwarf Oregongrape and Western Hemlock/Oregon Oxalis Plant Associations, described on the Willamette National Forest, may occur. Complete descriptions of these plant associations may be found in the Plant Association and Management Guide, Willamette National Forest (Hemstrom, Logan, and Pavlat, 1987).

LITERATURE CITED

Hemstrom, M., S. Logan, B. Pavlat. 1987. Plant Association and Management Guide, Willamette National Forest. R6-ECOL 257-B-86. 312 pp.

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The flow chart below shows a graphical presentation of the classification and the relationships between the plant associations.

The relationship of draft and final plant associations in the Western Hemlock Series is shown. The draft associations are listed, with the final associations below each in order of most to least common, with the percentage of plots that make up each association (refer to Methods sections).

TSHE-ABAM/VAME (N=11)

TSHE-ABAM (46%)
TSHE/ACCI-RHMA3 (27%)
ABAM-TSHE/VAME/ACTR (18%)
ABCO-TSHE/BENE2/LIBOL (9%)

TSHE/VAME/LIBOL (N=6)

TSHE-ABCO/BENE2 (83%)
TSHE/ACCI-RHMA3 (17%)

TSHE/RHMA/LIBOL (N=22)

TSHE/ACCI-RHMA3 (57%)
TSHE/RHMA3-GASH-SWO (14%)
ABCO/RHMA3-BENE2 (10%)
TSHE/GASH-RHMA3-SWO (4%)
TSHE-ABCO/BENE2 (4%)
TSHE-PSME/GASH-SWO (4%)
TSHE-THPL/RHMA3 (4%)
PSME/ACCI-BENE2 (4%)

TSHE/GASH-CHUM (N=5)

TSHE/GASH-RHMA3-SWO (60%)
PSME/ACCI-BENE2 (20%)
ABCO/RHMA3-BENE2 (20%)

TSHE/GASH/HIAL (N=1)

TSHE/GASH-RHMA3-SWO (100%)

TSHE/ACGL/LIBOL (N=8)

TSHE-ABCO/BENE2 (38%)
TSHE-ABCO/ACCI-BENE2 (25%)
ABCO-TSHE/BENE2/LIBOL (25%)
TSHE/ACCI-RHMA3 (12%)

TSHE/BENE/LIBOL (N=28)

TSHE/GASH-BENE2-SWO (32%)
TSHE-ABCO/ACCI-BENE2 (29%)
ABCO-TSHE /BENE2/LIBOL (14%)
TSHE/ACCI-RHMA3 (11%)
ABCO/RHMA3-BENE2 (7%)
LIDE3-PSME-QUCH2/BENE2 (4%)
PSME/ACCI-BENE2 (4%)

TSHE/BENE/ACTR (N=11)

TSHE/ACCI-RHMA3 (18%)
TSHE-ABCO/ACCI-BENE2 (18%)
TSHE-ABCO/BENE2 (18%)
ABCO-TSHE/BENE2/LIBOL (18%)
TSHE/GASH-BENE2-SWO (9%)
PSME/ACCI-BENE2 (9%)
ABCO/RHMA3-BENE2 (9%)

TSHE-ACMA/POMU (N=14)

TSHE/ACCI-GASH-SWO (36%)
TSHE/GASH/POMU-SWO (29%)
TSHE/GASH-RHMA3-SWO (7%)
TSHE-PSME/GASH-SWO (7%)
THPL/BENE2/POMU (7%)
PSME/ACCI-BENE2 (7%)
ABCO/ACCI/OXOR (7%)

TSHE-TABR/RHMA (N=8)

TSHE-CACH6/GASH-RHMA3 (25%)
TSHE/RHMA3-GASH-SWO (25%)
TSHE/GASH-BENE2-SWO (13%)
PSME/ACCI-BENE2 (13%)
ABCO/RHMA3-BENE2 (13%)
ABCO-TSHE/BENE2/LIBOL (13%)

TSHE-CADE3/GASH (N=6)

TSHE/GASH-RHMA3-SWO (50%)
TSHE/RHMA3-GASH-SWO (33%)
PSME-CACH6/BENE2 (17%)

TSHE/GASH/LIBOL (N=9)

TSHE/RHMA3-GASH-SWO (33%)
TSHE/GASH-RHMA3-SWO (33%)
TSHE-THPL/RHMA3 (22%)
TSHE/GASH/POMU-SWO (11%)

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TSHE-PSME/GASH (N=21)

TSHE/GASH-RHMA3-SWO (37%)
TSHE/ACCI-GASH-SWO (13%)
TSHE-THPL/RHMA3 (13%)
TSHE/RHMA3-GASH-SWO (10%)
TSHE/GASH/POMU-SWO (9%)
TSHE/GASH-RHMA3-SWO (9%)
TSHE-CACH6/GASH-RHMA3 (9%)
TSHE-PSME/GASH-SWO (3%)
PSME/ACCI-BENE2 (3%)
ABCO-TSHE/BENE2/LIBOL (3%)

TSHE/ACCI-RUNI (N=10)

TSHE/GASH/POMU-SWO (50%)
TSHE/ACCI-GASH-SWO (20%)
TSHE/GASH-RHMA3-SWO (20%)
TSHE/ACCI-RHMA3 (10%)

TSHE-THPL/OXOR (N=3)

TSHE/GASH-RHMA3-SWO (33%)
TSHE/ACCI-RHMA3 (33%)
TSHE/GASH/POMU-SWO (33%)

TSHE/ACCI/OXOR (N=4)

TSHE/ACCI-RHMA3 (75%)
TSHE/RHMA3-GASH-SWO (25%)

TSHE/GASH/OXOR (N=2)

TSHE/GASH-BENE2-SWO (100%)

TSHE/BENE/OXOR (N=7)

TSHE/ACCI-RHMA3 (14%)
TSHE/GASH-BENE2-SWO (14%)
TSHE/RHMA3-BENE2-SWO (14%)
PSME/ACCI-BENE2 (14%)
PSME-ABCO (14%)
ABCO/ACCI/OXOR (14%)
ABCO-TSHE/BENE2/LIBOL (14%)

TSHE-ALRU/POMU (N=2)

TSHE-CACH6/GASH-RHMA3 (50%)
PSME/ACCI-BENE2 (50%)

TSHE/RHMA (N=8)

TSHE/VAOV2/POMU (38%)
TSHE/RHMA3-BENE2-SWO (38%)
TSHE/POMU-SWO (13%)
PSME-CACH6/BENE2 (13%)

TSHE-CHLA (N=7)

CHLA-TSHE/POMU (43%)
CHLA/RHMA3-GASH (29%)
TSHE/RHMA3-BENE2-SWO (14%)
TSHE/POMU-SWO (14%)

TSHE/GASH (N=6)

TSHE/VAOV2/POMU (50%)
TSHE-PSME/GASH-SWO (33%)
TSHE/RHMA3-BENE2-SWO (17%)

TSHE-UMCA (N=16)

TSHE/VAOV2/POMU (31%)
LIDE3-TSHE/VAOV2/POMU (25%)
LIDE3/VAOV2-RHMA3-GASH (25%)
TSHE/POMU-SWO (19%)

TSHE-THPL (N=2)

CHLA-TSHE/POMU (50%)
TSHE/POMU-SWO (50%)

TSHE-ABCO (N=9)

TSHE-LIDE3/RHMA3-QUSA (22%)
LIDE3-TSHE/VAOV2/POMU-RIP (22%)
ABCO-TSHE/BENE2/LIBOL (11%)
ABCO/ARNE (11%)
CHLA-TSHE/POMU (11%)
TSHE/POMU-SWO (11%)
TSHE/GASH-RHMA3-SWO (11%)

Western Hemlock Plant Associations

1a. Location on the west side of the Siskiyou Mountains.	2
1b. Location not as above.	10
2a. Soils ultramafic, Port-Orford-cedar (CHLA) common.	Port-Orford-Cedar Series
2b. Soils not as above.	3
3a. Salmonberry (RUSP) present, often abundant.	TSHE/RUSP Page TSHE 12
3b. Salmonberry (RUSP) absent or less than 5 percent cover.	4
4a. Pacific rhododendron (RHMA3) present.	5
4b. Pacific rhododendron (RHMA3) absent.	TSHE/POMU-SWO Page TSHE 14
5a. Western sword-fern (POMU) greater than 5 percent cover.	6
5b. Western sword-fern (POMU) less than 5 percent cover.	8
6a. California-laurel (UMCA) present, often abundant and Port-Orford-cedar (CHLA) absent.	TSHE-LIDE3-UMCA Page TSHE 16
6b. California-laurel (UMCA) less than 2 percent cover. If greater than 2 percent cover, then Port-Orford-cedar (CHLA) greater than 10 percent cover.	7
7a. Salal (GASH) usually present.	TSHE/VAOV2/POMU Page TSHE 18
7b. Salal (GASH) absent.	TSHE-LIDE3/VAOV2-RHMA3 Page TSHE 20
8a. Port-Orford-cedar (CHLA) and/or tanoak (LIDE3) present.	TSHE/RHMA3-BENE2-SWO Page TSHE 22
8b. Port-Orford-cedar (CHLA) and tanoak (LIDE3) absent.	9

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- 9a. Douglas-fir (PSME) regeneration greater than or equal to 10 percent cover. TSHE-PSME/GASH-SWO
Page TSHE 24
- 9b. Douglas-fir (PSME) regeneration less than 10 percent cover. TSHE/GASH-RHMA3-SWO
Page TSHE 26
- 10a. Pacific silver fir(ABAM), Shasta red fir (ABMAS), and/or mountain hemlock (TSME) common; high elevation (over 4000 feet). TSHE-ABAM
Page TSHE 28
- 10b. Pacific silver fir (ABAM), Shasta red fir (ABMAS), and/or mountain hemlock (TSME) occasional or absent; medium to low elevation. 11
- 11a. Salal (GASH) present (warmer). 12
- 11b. Salal (GASH) absent (cooler). 22
- 12a. Pacific rhododendron (RHMA3) present with cover greater than or equal to 5 percent. 13
- 12b. Pacific rhododendron (RHMA3) absent or with cover less than 5 percent. 18
- 13a. Whipplevine (WHMO) present. 14
- 13b. Whipplevine (WHMO) absent. 15
- 14a. Golden chinquapin (CACH6) present with greater than 5 percent cover. TSHE-CACH6/GASH-RHMA3
Page TSHE 30
- 14b. Golden chinquapin (CACH6) cover less than or equal to 5 percent. TSHE/GASH-RHMA3-SWO
Page TSHE 26
- 15a. Douglas-fir regeneration (PSME) at least 10 percent cover. TSHE-PSME/GASH-SWO
Page TSHE 24
- 15b. Douglas-fir (PSME) regeneration less than 10 percent cover. 16
- 16a. Sadler oak (QUSA2) and tanoak (LIDE3) present. TSHE-LIDE3/RHMA3
Page TSHE 32
- 16b. Sadler oak (QUSA2) and/or tanoak (LIDE3) absent. 17

17a. Western red cedar (THPL) regeneration at least 10 percent cover.	TSHE-THPL/RHMA3 Page TSHE 34
17b. Western red cedar (THPL) regeneration less than 10 percent cover.	TSHE/RHMA3-GASH-SWO Page TSHE 36
18a. Western redcedar (THPL) present.	21
18b. Western redcedar (THPL) absent.	19
19a. Sadler oak (QUSA2) present.	TSHE/QUSA2-GASH-RHMA3 Page TSHE 38
19b. Sadler oak (QUSA2) absent.	20
20a. Incense cedar (CADE27) with greater than or equal to 10 percent cover.	TSHE-CADE27/GASH Page TSHE 40
20b. Incense cedar (CADE27) with less than 10 percent cover.	TSHE/GASH-BENE2-SWO Page TSHE 42
21a. Western redcedar (THPL) at least 5 percent cover.	TSHE/GASH/POMU-SWO Page TSHE 44
21b. Western redcedar (THPL) less than 5 percent cover.	TSHE/ACCI-GASH-SWO Page TSHE 46
22a. Pacific rhododendron (RHMA3) present.	TSHE/ACCI-RHMA3 Page TSHE 48
22b. Pacific rhododendron (RHMA3) absent.	23
23a. Slender salal (GAOV2) present, or at least four of the following herbs present: pathfinder (ADBI), threeleaf anemone (ANDE3), fragrant bedstraw (GATR3), mountain sweet-root (OSCH), and western starflower (TRLA6).	TSHE-ABCO/BENE2 Page TSHE 50
23b. Not as above.	TSHE-ABCO/ACCI-BENE2 Page TSHE 52